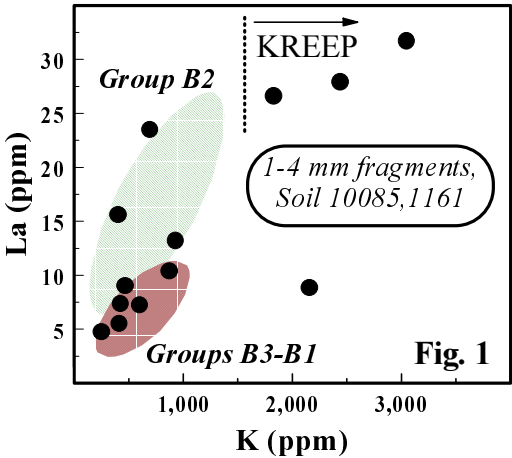


**“NEW” BASALTS AT MARE TRANQUILLITATIS: A SORTIE FOR PRISTINE ROCKS IN SOIL 10085.**  
G.A. Snyder, L.A Taylor, and E.A. Jerde\*, Planetary Geosciences Institute, Univ. of Tennessee, Knoxville, TN 37996-1410 (gasnyder@utk.edu); \*High Flux Isotope Reactor, Oak Ridge Research Institute, Oak Ridge, TN 37830

We have analyzed the minor element compositions of thirteen >1 mm igneous fragments from Apollo 11 soil 10085. Nine of the igneous rock fragments have chemical compositions consistent with other mare basalts from Mare Tranquillitatis: six plot within the field for Groups B3 and B1 basalts and three with the field for Group B2 basalts. Three of the thirteen igneous rocks have been affected by some degree of KREEP overprinting, yielding further evidence of the pervasive nature of KREEP,even in the eastern near-side landing sites. A single sample is enriched in K, but relatively depleted in the REE. Could this sample be another lunar granite?

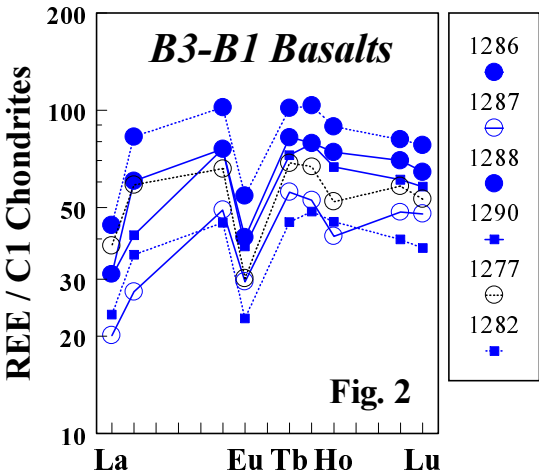
**INTRODUCTION --** In July of 1993, we began a study of igneous fragments in Apollo 11 and Apollo 12 soils [1-4] that is completed with this report and a pair of companion reports on the Apollo 12 samples [5-6]. In total, we have analyzed over 64 igneous rock fragments for both mineral-chemical and bulk-rock minor element compositions. Soil sample 10085 was collected in ALSRC container 1003 as part of the Bulk Sample at the Apollo 11 landing site and originally consisted of 569 grams of “fines”. This sample was sieved and thought to contain only <1mm fines; however, upon further examination, approximately 172 grams of fragments were found to be >1mm in size [7]. This size fraction became subsample 10085,104. A separate subsample of approximately 57 grams was then split (,1161), and it is from this subsample that the fragments described herein were taken. Twenty-six 1-4 mm rocklets, mostly basaltic to gabbroic in hand specimen and varying in mass from 95 to 18 mg were chosen from soil 10085 for a reconnaissance trace-element study. Thirteen of these analyses were reported previously and the remaining thirteen are reported here.

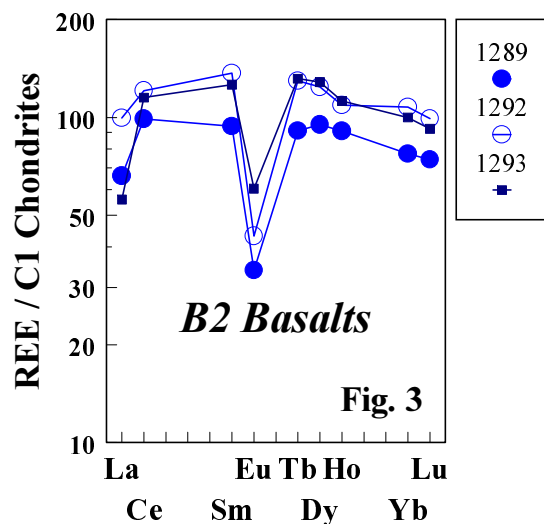


**MINOR ELEMENT COMPOSITIONS OF IGNEOUS FRAGMENTS --** All 13 rocks were analyzed for a suite of minor elements by INA at the High Flux Isotope Reactor, Oak Ridge National Laboratory, TN (Table 1). These analyses are plotted on a K (ppm) vs. La (ppm) diagram which includes fields for the Groups B3-B1 and B2 basalts [8] from Mare Tranquillitatis (Fig. 1). Three of the igneous fragments appear to have been either 1) affected by KREEP metasomatism, or 2) to contain more abundant mesostasis, and cannot yield petrogenetic information about the Apollo 11 landing site. A single sample (,1291) is enriched in K (2160 ppm), but is relatively depleted in the REE (La = 8.83 ppm). This sample could represent the K-frac of silicate liquid immiscibility and/or lunar granite, but needs to be studied in further detail. Nine of the igneous rocks appear to represent two of the main groups of high-Ti mare basalts found at this landing site. Basalts ,1277, ,1282, ,1286, ,1287, ,1288, and ,1290 all plot within the field for Groups B3-B1 basalts. Samples ,1289, ,1292, and ,1293 plot within the field for Group B2 basalts.

The full REE patterns for the six B3-B1 basalts and the three B2 basalts are shown in Figs. 2 and 3, respectively. Typical of high-Ti mare basalts, all of these fragments are demonstrably LREE-depleted.

**CONCLUSIONS --** Over the past three years, we have analyzed a total of 26 1-4 mm igneous fragments from Apollo 11 soil 10085, 1161. From this suite of samples we have discovered ten “new” Group B3-B1 basalts and five “new” Group B2 basalts. A single sample (,1291) is enriched in K (2160 ppm), but relatively depleted in the REE (La = 8.83 ppm) and could represent a “new” lunar granite.





**Fig. 3**

**REFERENCES:** [1] Snyder, G.A. et al. (1994) **LPSC XXV**, 1299-1300; [2] Snyder, G.A. et al. (1995) **LPSC XXVI**, 1327-1328; [3] Snyder, G.A. et al. (1996) **LPSC XXVII**, 1237-1238; [4] Snyder, G.A. et al. (1996) **LPSC XXVII**, 1239-1240; [5] Snyder, G.A. et al. [1997a], **LPSC XXVIII**, this volume; [6] Snyder, G.A. et al. [1997b], **LPSC XXVIII**, this volume; [7] Kramer, F.E. et al. (1977) Apollo 11 lunar sample information catalogue, JSC 12522; [8] Jerde, E.A. et al. (1994), **GCA** **58**, 515-527.

Table 1: Chemistry (in ppm, except where indicated) of >1mm Igneous Fragments from Soil 10085

[illegible]